

SCIENTIFIC NOTE

AGGREGATION IN TWO SYMPATRIC SPECIES OF CRANE FLY
(DIPTERA: TIPULIDAE)

Tipula acuta Doane and *Tipula simplex* Doane are two sympatric species of crane fly, the larvae of both inhabiting the soil of unirrigated pastures in Tulare County, California during the winter months, often aggregated under the same cowpads. Previous investigations (Hartman & Hynes, 1977, Pan-Pac. Entomol., 53:118-123; Hartman, Surfleet & Hynes, 1978, Pan-Pac. Entomol., 54:305-310) have shown that *T. simplex* larvae release a fecal pheromone that acts as a locomotory inhibitor, hence aiding aggregation.

The purpose of this research is to determine if *T. acuta* also produces a fecal pheromone or if it aggregates in response to the pheromone produced by *T. simplex*.

The apparatus used was modified from the one reported by Reeve and Berry (1976, Environ. Entomol., 5:961-963). Two 9 cm petri dishes were cut and joined together to make a choice-cage with a 4.5 cm opening between the two sections. Filter paper was placed in each side, and one side was moistened with 1.1 ml of an extract made by grinding the intestinal tract of one crane fly and diluting with 2.0 ml of distilled water, while the other was moistened with 1.1 ml of distilled water. Five larvae were placed in each side of the cage. The position of each larva was recorded after 24 hours.

Each species was tested for reaction to its own extract, and for reaction to the extract of the other, and each test was replicated six times. The data were analyzed using Chi Square.

Results are shown in Table 1. *T. simplex* shows a definite aggregation to extract of its own intestinal tract, confirming the presence of the aggregation pheromone previously detected by Hartman & Hynes (1977) and Hartman, Surfleet & Hynes (1978). However, *T. simplex* does not respond to the feces of *T. acuta*. *T. acuta* does not appear to have a fecal aggregating pheromone, nor does it respond to the one produced by *T. simplex*.

Table 1.

Test animal	Test extract	# Observed on extract	# Observed on H ₂ O	Significance
<i>T. simplex</i>	<i>T. simplex</i>	40	20	0.01
<i>T. acuta</i>	<i>T. acuta</i>	26	34	n.s.
<i>T. simplex</i>	<i>T. acuta</i>	29	31	n.s.
<i>T. acuta</i>	<i>T. simplex</i>	24	36	n.s.*

* Not significant at $P = 0.05$.

The aggregation of *T. simplex* is due not only to chemical communication, but also to its response to light and moisture as demonstrated by Hartman & Hynes (1977). The limited data we have gathered suggest that the responses to light and moisture in *T. acuta* are similar to the responses of *T. simplex*. The aggregation of *T. acuta* under cowpads, therefore, probably is due to the darker, moister environment found there, rather than to chemical communication among individuals in the population.

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